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DATA PROCESSING DIGEST

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Systems Engineering

"THE GROWING IMPORTANCE OF BUSINESS SYSTEMS"

Leslie Matthies, Northrop Aircraft Inc., Hawthorne, California
Keynote address, Systems and Procedures Conference, October 1956.

"...Systems helps to weld organized effort into an effective team play. These team plays do not result in perfection, but in relatively better teamwork than you could expect without a systems plan." Systems people find that many people do not understand what systems work really is. To some it is writing a procedures manual, to others systems men are "efficiency experts." Management frequently thinks of systems people as being a fire brigade, or a worker of miracles. The new electronic systems have been considered by some as the answer to more efficient systems, and still others hold the fallacious idea that office procedures can be improved in the same manner as production departments.

These random ideas are probably not surprising in view of the recent emergence of true systems work since World War II. It was born out of the necessity of controlling the amount of paperwork which clogged up business procedures during the stepped-up production of the war years. Each department had a tendency to initiate the type of form or order it needed to keep track of its activities, with resulting copying and recopying of information from department to department.

Unfortunately, there is still a great deal of quackery in the systems profession, caused by the shortage of qualified systems people, and the lack of understanding among management of what to expect from a good systems program. It appears, however, that computers are forcing real systems surveys.

The author says that "systems is management's forgotten duty." He breaks down systems into a simple example--a small machine shop with the owner in direct communication with the machinist. He shows how the verbal orders issued by the owner in an informal manner match up with the more formal types of communication with the man on the production line. A system is a manager's control, and authority can be delegated through the system. When

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Systems is a management technique

the company grows larger, and the manager no longer gives verbal directions to the machinist, the system will take care of delegating this task to the proper person. "In the system, your decisions, as they apply to routine operations, have been made once and for all. Your decisions are built-in to your systems plan! Now your helpers, the office people, can exercise your authority by issuing systems paper (forms). This action will result in work being done, in costs being incurred, and, we hope, in a profit being made. Stop thinking of the office as a mere clerical function. Remember that the office is, in its true light, an extension of the boss himself. 'Office' is a word derived from 'official.'"

"Systems has before it the opportunity to become one of the greatest of management techniques....We are aides to the boss as architects of his management plan." Systems work should have depth, rather than spreading itself around among many little jobs. "If we agree that systems work must be done by defining and isolating definite systems cycles, and then improving those cycles, then it is also essential that we consider the inter-relationship of all these systems cycles....We have developed a master chart that has helped us. We set up an over-simplified chart that traces all work authority flow. The flow starts with the time the customer's order comes in the door. It ends with the customer's check in payment for our shipment....We mounted samples of the actual authority forms, such as the sales order, the engineering order, the purchase order, the shop order, and the shipping papers. These were set up in flow sequence, and connected by red cellophane tapes. That chart gave us perspective. We could relate all other systems or procedural cycles to it, and not get lost.

Systems is a 3-step cycle

"To get a clean system you must isolate, identify, and define the procedural cycle that you are considering. Within this cycle three types of systems action must take place. The first of these actions is the release of authority....The second step in the systems cycle is the record. [The third is the report.] That is a system. Basically you can add nothing more to it.

"If you can't find a clear cycle pattern at first, keep beating away until you do. Everything in business has got to make sense. Every action starts somewhere and it has to go somewhere, then stop. Find that ending, then find what goes on between. Then you have a 'fix' on your procedural cycle."

A systems crew need not be large, and it can serve best in a staff capacity, as consultants to the operating men. The systems man must retain the broad view of the boss.

Systems is also an excellent training ground for future management, and might well be used for this purpose in an organization.

"SYSTEMS PLANNING AND CONTROL" — REPORT #12

American Management Association, 1956

Systems planning is a management function

This report grew out of a special conference on "Systems Planning and Control" sponsored by AMA in April 1956. Its general theme is expressed in the foreword: "...systems work involves the coordination of all managerial efforts toward the goal of increased profits." In Part 1, this concept of systems work is expanded in five papers by persons well known for their creative thinking about business systems: Melvin L. Hurni, Adrian McDonough, M. S. Shane, J. W. Haslett, Matt W. Boz, and Ralph C. Peck. Part 2 gives concrete examples of creative systems planning at Lockheed Aircraft Corporation and Cleveland Electric Illuminating Company. Two interesting articles are included in the appendix: "A Mathematical Model for Integrated Business Systems," by Kozmetsky and Lieberman (see DPD: October 1956, page 1), and "Management's Use of Office Systems and Procedures," by R. N. Carpenter.

The report seems to be both a plan and a challenge to businessmen to see their organizations in a new context. Mr. Hurni points to business as a servomechanism. Mr. McDonough reminds us that business does not deal with "facts" but with symbols which represent things we see (percepts) and things we cannot see (concepts). The farther removed a manager is from the actual manual handling of the product, the more symbolic and conceptual is his job, and the more he must use imagination rather than arbitrary "facts" to control the business. Mr. Shane views the business enterprise as a wheel, rather than the conventional straight line, with executive leadership, management, and systems at the center, and objective-setting, planning, organizing, and controlling surrounding the center, with each activity progressing counter clockwise. Mr. Haslett and Mr. Boz give an example of a dynamic systems function in a widespread organization, at Shell Oil Company. The use of the systems principles in a small business is discussed by Mr. Peck.

In Part 2, Lockheed views its systems work as a consulting service to its greatly decentralized operation, keeping local managers aware of improvements, and coordinating systems procedures throughout the corporation. The Cleveland Electric Illuminating Company sees the need for sound and thorough planning, control, and an adequate reporting system to keep every department on keel.

"SYSTEMS ENGINEERING IN BUSINESS DATA PROCESSING"

Ned Chapin, Illinois Institute of Technology, Chicago
COMPUTERS AND AUTOMATION, October 1956; pages 6-9, 54.

Systems engineering is defined as "the creation of a deliberate combination of three types of service to accomplish an information processing job." Several features of the definition are pointed out: 1) systems engineering is a mental process, 2) it requires a goal (that is, it is a means to an end), 3) it usually results in doing

things in new ways, 4) it involves devising combinations of types of services, 5) these services are human, material and machine.

The three types of services are those which prevail in any type of business system. However, the approach of the systems engineer in using these services differs from that of the business system analyst in several ways:

"Systems engineering is usually concerned with creating new combinations of services, whereas business systems analysis is usually concerned with improving upon an existing combination..."

Systems engineering is "goal-oriented"

Systems engineering is "goal-oriented" where the goal is "the improved control of the operation of the business. In contrast, the usual goals of business systems analyses are such things as to eliminate a processing bottleneck..."

"Systems engineering is more total in its approach and takes longer to do...takes as its starting point the goal to be achieved.... By contrast, business system analysis usually takes as its starting point some unsatisfactory elements in the present information processing in the business."

Two schools of thought in business systems analysis are described, the first being "how to create business systems," the second being a series of "models or patterns of what constitute good business systems in many representative situations or areas." The first of these schools is suggested as being closer to the idea of systems engineering. "The emphasis in the second school of thought is upon the 'tricks' and 'wrinkles' that have worked well in practice as aspects of systems solutions to business problems."

Users of automatic computers have followed both of the above schools, and references are made to illustrate these points. An example of the first school is the work of Matt W. Boz, as described in an article by him in Management Methods, January 1954: "How Your Firm Can Organize an Electronics Investigation Program." An example of the second school is R. R. Ross' article in Workshop for Management, 1956 (published by Management Publishing Corp., Greenwich, Conn.): "Application of Electronic Data to Billing and Accounting."

Long-range planning and new concepts

((We would like to comment upon the opinions expressed by Mr. Chapin, in that we believe he may not have adequately evaluated the work of Mr. Ross. The article referred to was the transcript of a talk given by Mr. Ross before the Systems and Procedures Association Annual Meeting. In it, Mr. Ross suggests an approach for "the inevitable move" to electronics. "The sound approach...implies a complete study of current routines in terms of management's requirements and the potential of the equipment....Development of a long range program for electronics requires both vision and courage; the vision to approach management's requirements, and the courage to propose a long term program compatible with the potential of the equipment." Mr. Ross speaks of "assembly lines" of information throughout the company, and the interrelationship of these assembly

lines. "It is this complete integration of functions for automatic processing that presents the ultimate in electronic data processing."

As an illustration of his ideas, Mr. Ross presents a theoretical automatic data processing system in which the functions of the organization are grouped into areas of accounting. "The purpose of developing a master accounting plan was to illustrate the interrealtionship of accounting functions which might be considered in long term planning for an electronic accounting system." The areas suggested refer to a retail or wholesale business, but each area has its counterpart in other types of businesses. The five areas are: Inventory Accounting, Customer Accounting, Vendor Accounting, Employee Accounting, and General Accounting. In our opinion, this approach does not employ "tricks" or "wrinkles" in the use of electronic equipment, but rather presents a new concept of business defined by areas of "accounting" or record-keeping and information passing, which is closer to the systems engineering ideal than most electronic business systems come.))

Applications

"THE USE OF LARGE SCALE COMPUTER FOR MANUFACTURING CONTROL"

F. C. Carlin, Lockheed Aircraft Corp., Burbank, California.
Paper presented at Institute of Management Sciences, October 1956.

A unique computer set-up exists at the Lockheed plant in Burbank. Two IBM 704 scientific computers (which recently replaced 701's) are used jointly by the Accounting and the Engineering Branches.

Accounting and Engineering share computer time

When it was found that time was available on the company's first scientific computer, the EDPM study group tried applying their problems to it, with great success. Subsequently, another 701 was purchased. The largest punched card application, Production Order Control, was analyzed, and it was found that a saving of $100,000 per year would be realized. An important reason why the scientific computer was the answer at that time was the fact that the only large scale business machine available, the Univac, did not meet the three basic requirements of 1) a high speed memory with at least 20,000 digits of storage, 2) extremely rapid internal operating speeds and, 3) a line-a-time printer. In addition to the Production Order Control operation, these procedures were also converted from punched card methods to the computer: forecasting of direct labor hours, forecasting of shop order counts, and the maintenance of an index to the parts utilizing each individual type of tool.

The Engineering and Accounting Branches shared equally the cost of preparing the area for the computing center. Certain shifts

were allotted to each branch, and the computers were operated on a round-the-clock seven day per week basis. Within six months after the installation of the second machine, the Accounting Branch was using about 65% of the total time. A few difficulties arose in establishing priorities for jobs between the two branches. However, the greater capacities of the new 704's have eliminated the crowded schedule.

"Fortunately, all special devices and features required by each branch did not detract or interfere in any way with the normal operation of the equipment.... By mutual consent of the two organizations all such changes were ordered and charged thereafter to the function initiating the order. However, if the other party should elect to use such equipment or devices, he was thereafter required to share in its rental on a usage basis.

"From the inception of our use of large scale computers as an aid to our production control processes, we have been faced with diametrically opposed viewpoints from different organizations within our Management. Areas of activity which have been largely handled by judgment have not responded to the idea of defining the elements comprising their judgment. Because of this they must expend substantial effort in refining the data they receive from the computer. In my opinion, this is rather unfortunate since their manipulations are of the type which a computer can handle with ease."

The company believes that "best results can be obtained by having the methods planning and the machine coding done by one group, and that each person within the group should be capable of doing both. Such an arrangement minimizes communication problems, eliminates the evil of having to accept material on blind faith which perpetuates errors, provides for maximum flexibility in modifying the block diagrams where equipment characteristics dictate a change in the interest of overall benefits and provides a basis for job enlargement. This latter attribute aids in the building of a group imbued with high job interest and morale. Administratively matters are also simplified in that responsibility for a complete job is not split."

Some of the benefits which have resulted from use of the computer are: cost per unit of work processed has fallen 25% and is expected to drop farther; company has obtained more timely data, increased accuracy, better parts control, reduction in flow time of an Engineering Release by two weeks, better handling of revisions to manufacturing quantities and schedules (sometimes in four weeks less time); improved management control through better knowledge of forecasted shop activity.

"AUTOMATION IN BANK OPERATIONS"

Herbert R. Corey, First National Bank, Boston
UNITED STATES INVESTOR, October 27, 1956; pages 22-26.

A review is given of the status of electronic equipment to answer the needs of the banking industry. Mr. Corey was a member

Progress in banking electronics

of the committee of the American Bankers Association which made a study of banking needs.* This committee has already recommended a common language for prequalification of checks, and manufacturers are turning their efforts toward designing equipment for automatic check handling using these recommendations. The committee expects by the end of this year to have specifications ready for the design of checks. High speed check sorters are also being designed. Needs of smaller banks are being considered by manufacturers in the design of such equipment as the NCR Postronic and Burroughs Sensitronic. It is suggested that a group of small banks in an area could establish an electronic data processing center to do all the bookkeeping and other operations for the member banks.

*See DPD: Sept. 1956, page 7 and Oct. 1956, page 8.

"JOHN HANCOCK CONVERTS FROM PUNCHED CARDS TO MAGNETIC TAPE"

Robert E. Slater, John Hancock Mutual Life Insurance Co., Boston.
THE OFFICE, October 1956; pages 79, 80.

In a resume of the talk presented at the AMA conference on Electronics at Work, some reasons are given for John Hancock's conversion of files to magnetic tape. The company has been processing over 200 million punch cards a month. Since their present methods are highly mechanized, they find it advisable to convert their manual records to punch cards and then to magnetic tape. All necessary information on any policy will be kept in one place on the tape, eliminating the present 25 possible locations.

Decentralized service solves random access problems

To help solve the problems involved in random access to data on tapes, the company is decentralizing service functions to the field offices. This has also greatly improved service to the policyholders, and in addition, reduced costs. About 94% of such transactions will be completed by field offices. Although the company believes it essential that company personnel be responsible for the planning and execution of an electronics program, they believe it advisable to have their planning checked by professionally qualified consultants.

"IBM PUNCHED-CARD ACCOUNTING IS ADAPTED TO MAKE SCHOLARLY INDEXES"

PUBLISHERS' WEEKLY, November 5, 1956; pages 2150-2152.

This article is interesting primarily because it points toward the use of electronic equipment in lightening the laborious job of indexing in the areas of documentation. (Another use of electronics in indexing was mentioned in DPD, April 1956, pg 12: use of Univac in preparing the concordance for the RSV Bible.) IBM World Trade Corporation cooperated with the Rev. Roberto Busa of Italy to index

New hope for index editors

the works of St. Thomas Aquinas. Father Busa is now setting up the world's first literary data processing center. The method devised by IBM and Father Busa has promising applications in such areas as chemical and patent research as well as many other areas of science and literature.

"MAGNETIC INK CHARACTER RECOGNITION"

COMPUTERS AND AUTOMATION, October 1956; pages 10-16, 44.

This is a complete reprint of the report of the American Bankers Association which appeared in BANKING, August 1956 (see DPD: September 1956, page 7). The report is the recommendation for the adoption of magnetic ink character recognition as the common language most suitable for check handling.

"UNSCRAMBLING PIPING POSERS"

CHEMICAL WEEK, October 27, 1956; page 112.

Blaw-Knox and Great Lakes Pipeline are using computers to simplify piping design and the operation of a pipeline network.

"NEW ELECTRONIC COMPUTER KEEPS MEDICAL RECORDS"

ELECTRONIC WEEK, November 12, 1956; page 7.

The Michigan Hospital Service and Michigan Medical Service have leased a new DATAmatic 1000 computer system which will process the services' 25,000 daily transactions and record changes in two hours. The remaining computer time will be used for billing and compiling of statistics.

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Programming

COMPUTING NEWS, November 15, 1956

A letter to would-be programmers

This newsletter always is filled with interesting information for a computer or CPC programmer. However, this particular issue has an item which will answer questions asked by those who want to enter the computer field, but don't know where to start. It is an "open letter to person who wants to move into EDPM."

He is warned that the equipment he is probably using at present won't be able to compete with EDPM a few years from now. He is advised to begin reading about EDPM, talk to people in the field, take IBM's aptitude test for programming proficiency, and look into local job opportunities with companies who have already gone into EDPM.

Another interesting feature of the COMPUTING NEWS is the periodic appearance of a chapter from the book "EDPM and You," being written sporadically, entertainingly, but informatively by the editors. This and other articles make this semi-monthly newsletter of value to computer center operating and administrative personnel.

General Information

"TOP MANAGEMENT CONTROL" - SPECIAL EMPHASIS FEATURE

DUN'S REVIEW, October 1956; beginning page 57.

An imaginative view of business

The introductory page to this special feature includes these words: "Companies are growing so fast, becoming so complex, that presidents are seeking better ways to control operations without being entangled in details." The feature follows up this statement with these seven articles: Why top management controls need tightening, Administrative automation begins to move in, New tools will change the president's job, What presidents want in their control reports, Computers call for common sense, Diagnose your own problems, What's ahead in data processing equipment?

This feature is in line with the trend of thoughtful business literature toward a long careful look at traditional business methods. The sloughing off of old, redundant systems and methods, and the imaginative approach toward management planning and control call

for scientific methods and scientific tools, of which O. R. and electronic computers are the present examples. The feature stresses the use of computers as a tool in the management function, rather than as the clerical cost-cutting technique which has been high in popularity in the past two or three years.

"JOB OPPORTUNITIES — WITH ELECTRONICS"

George Boyd, Remington Rand
THE SPECTATOR, October 1956; pages 38-39, 56.

Here are some suggestions for the insurance employer who is considering the installation of electronic equipment, to anticipate and provide for resulting questions, fears and displacements of employees:

Personnel policies in automation

1. Let employees know the facts--in advance.
2. Give employees a chance to qualify for jobs in the new department.
3. Redesign salary policies to keep qualified persons.
4. Carefully relocate those persons whose jobs cannot be absorbed into the new system and who have long seniority.
5. Temporarily stop hiring until readjustment is made and normal attrition provides for eliminated jobs, except where no employee is qualified for a specific job.

"ELECTRONIC AIDS FOR MANAGEMENT: HOW TO SHOP"

CHEMICAL WEEK, November 3, 1956; pages 30, 31.

Even the "small" or "medium size" chemical companies may be able to use computers to advantage, according to John Diebold, consultant, if certain conditions exist. He provides a check-list of 13 problems which may indicate profitable applications of electronic methods: delays, too many reports, executives doing clerical work, uniformed decisions, requests for information, decision-making postponements, insufficient data, bulky files, "hunch" planning, unanticipated requirements, inventory imbalances, annual statement delays, overtime on report preparation.

"GLOSSARY OF TERMS IN THE FIELD OF COMPUTERS AND AUTOMATION"

COMPUTERS AND AUTOMATION, October 1956; pages 17-36.

This is a revised and expanded glossary, the last version of which appeared in the same publication in January 1956.

Management Decision-making Techniques

"A CONTINUATION OF THE BEST IN INDUSTRIAL ENGINEERING"

George P. Champion, Lockheed Aircraft Corp.
JOURNAL OF INDUSTRIAL ENGINEERING, July-August 1956; pages 142-147.

O. R. bibliography

Operations research is considered as a continuation of industrial engineering, with the difference that "the O.R. man, unlike the industrial engineer...makes no decisions. This is the job the executive should do. The O.R. specialist is looking primarily for answers that can be expressed in numbers, and when he has turned over his quantitative conclusions to the executive, it is then time for the O.R. man to seek a new problem to be solved." The article includes brief descriptions of the O.R. tools (modelmaking, servo theory, etc.), and a list of defined terms. The bibliography of twenty-two references to articles and books on operations research should be of value to those wishing to do some reading for deeper understanding of O.R.

Equipment

ELECOM 125 BUSINESS DATA PROCESSING SYSTEM

Here are some new features which have been added to this medium size computing system:

ELECOM 125 Computer

New features

Optional main memory sizes of 6000, 8000, or 10,000 words can be furnished.

The standard speed of magnetic-tape input and output is 6000 digits per second. This may proceed in parallel with computation.

Two four-digit Base Registers are included as standard equipment.

High-speed punched tape read utilizes the buffer unit, so that punched tape read proceeds in parallel with internal operations.

Auxiliary Equipment

The ELECOM High-Speed Line Printer operates at the rate of 900 120-character lines per minute. The printer is activated by magnetic tape, independent of the computer operation.

Code translators to accept or furnish data punched in five-, six-, seven-, or eight-hole code paper tape are available.

"HELPING HAND FOR THE DATA PROCESSOR"

BUSINESS WEEK, October 27, 1956; page 105.

Typatape, Inc. (New York) has evolved a system for producing coded data printed on paper tape from any mechanical business machine such as bookkeeping machine or cash register, with only a mechanical connection. This tape is then passed through a converter which reads the tape photoelectrically, and sends the information to a card punch.

" 'HONEYCOMB' STORAGE UNIT"

JOURNAL OF THE FRANKLIN INSTITUTE, October 1956; page 323.

General Electric has developed an inch-square "honeycomb" of glass with etched spots filled with metal, which can store nearly 140,000 characters of information. The honeycomb is enclosed in a glass tube, at one end of which is an electron-beam scanning device for writing information, and at the opposite end a "reading gun." Each honeycomb has 250,000 storage cells, and each cell will recognize at least 10 different levels of intensity from the writing gun. Smaller electronic computers with bigger memories are among the anticipated applications.

"BRITAIN IN ELECTRONIC RACE"

Derek Wragge Morley, London FINANCIAL TIMES
AMERICAN BUSINESS, October 1956; pages 24, 38.

A new series of Hec computers has been announced in England, with punched card and printed outputs. A new Powers-Samas, Ferranti electronic office will be available in 1957. This will consist of an integrated system of from six to 20 conventional punched-card data handling machines, each of which will be linked electronically to the computer. Cost range will be from $70,000 to $280,000.

Comment

EDP PERSONNEL

Suggested job titles and qualifications

In order to allow intelligent discussion and interchange of data about personnel for programming and operating electronic data processing systems, users must begin to standardize job descriptions. Below is a list of job titles for EDP jobs with descriptions of the qualifications and duties for each. It is hoped that this list will serve as a basis for the development of uniform EDP personnel nomenclature. We do not necessarily recommend that these titles, nor the descriptions, be adopted by any particular company. They are meant merely as a guide for standard EDP personnel practices.

Any comments on these titles, or on any phase of the problem of selecting and training EDP personnel will be welcomed by the publishers of DATA PROCESSING DIGEST.

I. Senior Methods Analysts

A. Qualifications:

1. Ability to communicate with all levels of management and operating personnel.
2. College degree or equivalent (type of degree does not appear to be significant).
3. High ability to reason and think logically.
4. Ability to work with new groups of people: patience, especially in the face of illogical developments.
5. Experience in analyzing broad areas of a business.
6. Have a complete knowledge of electronic computers and data processing systems and methods of programming (as a result of training).

B. Duties:

1. To understand the objectives of management and the purpose of each business procedure.
2. Fully understand present procedures through discussion with operating personnel and review of present methods.

3. Create an electronic data processing procedure, using the equipment (to be) available, which accomplishes the desired purposes of the procedure in the most economical way.

4. Supervise methods analysts and programmers.

II. Methods Analyst

A. Qualifications:

1. College degree or equivalent (type of degree does not appear to be significant).

2. High ability to reason and think logically.

3. Ability to work with new groups of people: patience, especially in the face of illogical developments.

4. Ability and preferably experience in analyzing broad areas of a business.

5. Have a complete knowledge of electronic computers and data processing systems and methods of programming (as a result of training).

B. Duties:

1. Fully understand the purpose of a business procedure through discussion with management.

2. Fully understand present procedures through discussion with operating personnel and review of present methods.

3. Create an electronic data processing procedure, using the equipment (to be) available, which accomplishes the desired purposes of the procedure in the most economical way.

4. Supervise one to ten programmers.

III. Chief Programmer

A. Qualifications:

1. Bachelor degree or equivalent.

2. The chief programmer should have had at least three years experience in programming general-

purpose computers. Of these at least one year should have been in programming a computer for commercial applications.

3. This person should have facility with all types of automatic programming techniques.

4. He should have the ability to supervise technically a large group of programmers.

B. Duties:

1. The chief programmer is responsible for the entire programming effort of the company.

2. The chief programmer is responsible for selecting, training and supervising at least 20 programmers and coders.

3. He is responsible for establishing programming standards, for the development of library programs, and for advanced programming techniques.

4. He will work with methods analysts to insure that the company's problems are solved in the most economical manner on the computer.

IV. Programmer

A. Qualifications:

1. High school degree or equivalent, special facility with high school arithmetic and algebra.

2. High ability to reason or think logically.

3. Normal ability to work in a group undertaking a cooperative effort.

4. Persistance: willingness to perform detailed work. Patience to carry out an assignment whose requirements are continually changing.

5. Have (a) a complete knowledge of the computer system to be used, (b) the techniques of programming, and (c) the ability to operate the computer system (all as a result of training).

B. Duties:

1. From data and charts supplied by Methods Analysts which describe a process, prepare charts and explanations showing the detail operations of the computer required to perform the process. This

V. Coder

A. Qualifications:

1. Ability to perform detailed clerical work accurately and rapidly.

2. Have an understanding of the operation of the computer system, and the procedures for sequencing the computer operations (as a result of training).

B. Duties:

1. From detail charts and explanations of a computer process (prepared by a programmer) prepare the detail codes (sequences of numerical and alphabetic characters) for the computer.

2. Some coders will be programming trainees.

VI. Data Processing System Supervisor

A. Qualifications:

1. Ability to supervise an expensive machine installation.

2. Ability to schedule work for the installation. (The computer will work on many different jobs each day.)

3. Have an understanding of the operation and functions of the computer; and a good knowledge of the computer operating procedures (as a result of training).

B. Duties:

1. Supervise all operations of the data processing center.

2. Schedule (or supervise scheduling) all work for the computer and its various auxiliary devices.

VII. Console Operator

A. Qualifications:

1. Great care and accuracy in following instructions, preparing reports operating the computer.

2. Have a general knowledge of the computer system and a detailed knowledge of the computer operating procedures (as a result of training).

B. Duties:

1. Operate the computer according to detailed instructions, schedules, and procedures.

2. Direct the work of one to three clerks.

VIII. Auxiliary Equipment Operators

Same general qualifications and duties as tabulating equipment operators.

IX. Clerks (tape handlers and file clerks)

A. Qualifications:

No special ones.

B. Duties:

Change magnetic tape reels; handle cards; file reels of tape; prepare routine reports.

Many variations in exact job descriptions are possible. The above set of jobs has been written under the assumption that methods analysts will supervise the work of programmers. The chief programmer acts in a staff-like capacity to advise the programmers in technical matters. Another method of organization has the programmers supervised by a chief programmer. This increases the administrative duties of the chief programmer and senior programmers and reduces the administrative duties of the method analysts. Both methods of organization are used and there is no evidence that either is preferable in general; the specific problems in a given company would determine which is preferable.

In some installations the senior programmer position is equivalent to the methods analyst's position; actual programming being done by programmers and junior programmers. In fact, in almost every installation the line between detailed methods work and programming is very hazy.

Methods analysts are also named "systems analysts" or "system designers."

In addition to the personnel mentioned above, maintenance personnel of various levels are required if the user has purchased and maintains his own equipment.

References

The addresses of publishers and periodicals mentioned in this issue of Data Processing Digest are listed below for your convenience in obtaining further information about the articles or books listed.

American Business
4660 Ravenswood
Chicago 40, Illinois

American Management Association
1515 Broadway, Times Square
New York 36, New York

Business Week
330 West 42nd Street
New York 36, New York

Chemical Week
330 West 42nd Street
New York 36, New York

Computers and Automation
513 Avenue of the Americas
New York 11, New York

Computing News
Box 885
Richland, Washington

Dun's Review
99 Church Street
New York 8, New York

Electronic Week
19 East 62nd Street
New York 21, New York

Journal of the Franklin Institute
20th and the Parkway
Philadelphia 3, Pennsylvania

Journal of Industrial Engineering
225 North Avenue, N. W.
Atlanta, Georgia

The Office
232 Madison Avenue
New York 16, New York

Publishers' Weekly
1309 Noble Street
Philadelphia 23, Pennsylvania

The Spectator
Chestnut and 56th Streets
Philadelphia 39, Pennsylvania

United States Investor
286 Congress Street
Boston 10, Massachusetts

See DPD September 1956 for list of more than seventy periodicals regularly reviewed for significant information in the data processing and related fields.

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Meetings

Western Joint Computer Conference

Date: February 26-28, 1957
Place: Los Angeles, California (Statler Hotel)
Theme: "Techniques for Reliability"
Information: S. D. Wanlass, Systems Research Corp., 13729 Victory Blvd., Van Nuys, California

Third Annual High-Speed Computer Conference

Date: March 5-8, 1957
Place: Baton Rouge, Louisiana
Information: Dr. Leon Megginson, College of Commerce, Louisiana State University, Baton Rouge, Louisiana

International Conference and Exposition sponsored by NOMA.

Date: May 12-16, 1957
Place: Los Angeles, California
Information: National Office Management Association, 132 West Chelten Avenue, Philadelphia 44, Pa.

International Conference on Operational Research, sponsored by Operational Research Society, Operations Research Society of America, The Institute of Management Sciences.

Date: September 2-6, 1957
Place: University of Oxford, England
Subjects: The common themes in operational research, methodology, applications

Send proposals for papers to:
Dr. Thornton Page, Chairman joint O.R.S.A./TIMS Committee, Operations Research Office, 7100 Connecticut Avenue, Chevy Chase, Maryland; or to: Mr. B. H. P. Rivett, Hon. Secretary, Operational Research Society of United Kingdom, 2 Grosvenor Place, London, S.W.1.

Eastern Joint Computer Conference

Date: December 1957
Place: Washington, D. C.

Training

"'Integrated' Data Processing," seminar sponsored by A M A
Date: January 7-9, 1957
Place: New York City
Information: Franc M. Ricciardi, American Management Association, 1515 Broadway, Times Square, New York 36, New York

Engineering and Management Course, University of California at Los Angeles
Date: January 21-31, 1957
Place: Los Angeles, California
For whom: Engineers and managers, all levels
Subjects: 25 subjects covering operations research, electronic data processing, management decision-making, industrial engineering, etc.
Cost: $350
Information: Edward P. Coleman, Coordinator, Engineering and Management Course, College of Engineering, University of California, Los Angeles 24, California

General Management Conference, sponsored by AMA
Date: January 29-31, 1957
Place: Los Angeles, California (Statler Hotel)
Information: American Management Association, 1515 Broadway, Times Square, New York 36, New York

Operations Research in the Planning of Computer and Data Processing Systems, sponsored by Case Institute of Technology
Date: January 30-February 1, 1957
Place: Cleveland, Ohio
Information: W. W. Abendroth, Operations Research Group, Engineering Administration Dept., Case Institute of Technology, 10900 Euclid Avenue, Cleveland 6, Ohio.

Special Seminar Program, Western Reserve University School of Library Science
Date: February 4-8, 1957
Place: Cleveland, Ohio
Subjects: Documentation survey, Machine aids to librarianship, Special libraries
Information: Jesse H. Shera, Dean, School of Library Science, Western Reserve University, Cleveland 6, Ohio

Seminars in operations research presented by Operations Research Institute
Date: One seminar each month through June, 1957
Subjects: Inventory and production management, Linear programming, Forecasting and budgeting.
Information: Operations Research Institute, Inc., 41 Fifth Avenue, New York 3, New York.

N.M.A.A. CHAPTER HAS ITS OWN TRAINING COURSE

Three-phase program of study

The Los Angeles Chapter of the N.M.A.A. is holding its own Data Processing Management course to "analyze, evaluate, and record in logistical order the steps or procedures necessary for anyone to process 'data.'" The program has been in progress since November 5, and will continue through March 4. The plans

call for presentation of the course to all local N.M.A.A. members. Later, the course will be offered to executives of the companies enrolled in N.M.A.A. The course is divided into three phases: Theory of Data Processing Management (what to do), Application of Theory with Case Study (how to do it), Transition of Systems (why you did it). Persons interested in more information about the training course may write Mr. Gus J. Marquette, 1670 Wilshire Blvd., Los Angeles 17, California.

NEW FILM FOR MANAGEMENT

A new animation film, "Electronic Computers Improve Management Control," has been produced by the University of California at Los Angeles, Extension Division, which can be of value to top management in understanding the potentials of electronic data processing techniques in their businesses.

Production control shown as an example

The film shows a predicament in a typical manufacturing organization, the XYZ Furniture Company, when a large order is cancelled because of delays in producing the required amount of furniture. The history of the order is traced step by step from the order placement, to the inventory check, to material requisition, to production. The culprit is found to be paperwork delays with resulting lack of management control.

The animation now gives way to live film as the XYZ executives are shown film clips of many types of modern business machines. After the movie within the movie, the animation takes over again to show how these machines could be used to design an efficient production control system. Then this system is applied to the specific problem of the XYZ Company.

Since the broad scope of EDP has been compressed into 15 minutes, this film contains more information than can be absorbed in the first viewing. However, the value of the film is that it presents the subject in a logical, unadorned fashion, step-by-step, an excellent introduction for a group study of EDP. After the study, the group would greatly benefit from viewing the film again, catching many of the points that may have passed unnoticed when the members were less familiar with the subject.

The production is attractive and clever, but the cleverness does not detract from the message. In fact, tricks of design are used to enhance the meaning, as in the shots of myriads of clerks and typists whose torsos merge into their desks, making them, not really human, but mere extensions of the machines they so vigorously operate. We especially liked the "music score" which is an actual recording of the electronic tones produced by a paper tape punch.

The film is available for rental and for sale. Inquiries may be directed to the Educational Film Sales Department, University Extension, University of California, Los Angeles 24, California. Refer to: Cat. #EF-5610; 15 min. color; price: $150; rental: $5.00.